The Fuzzy Set Theory is an attractive methodology when vague and subjective judgments of a unique phenomenon enter probabilistic or mathematical models. The aim of this study is to develop a model for seismic hazard prediction able to reproduce both the randomness and the imprecision in conjunction with earthquake occurrences. For seismic hazard analysis, all of the variables converted into triangular fuzzy sets by using of alpha-cut method. This is done by discretizing the membership functions of fuzzy magnitude, distance, lambda and beta into several alpha-cut levels. The methodology has been applied for assessing the variables in Tehran metropolitan area. The results are given as fuzzy intervals which accommodate the vagueness inherent in the data.